GX Installation Guide

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Preface

This *GX Installation Guide* provides illustrated instructions for installing the GX card into a Sun Workstation. The GX is an 8-bit color/grayscale graphics accelerator card. This guide also describes how to power up the system after installing the GX.

If you are installing a GX card into a SPARCstation, it is recommended that you read the *Installation Guide* that came with your system for additional information.

How to Use This Book

In this book each chapter begins with an introduction that tells you what the chapter contains. By reading the introduction you can quickly determine whether a particular topic relates to what you want to do. This guide covers more than one system. You can skip the chapters that do not apply to your particular system. It is a good idea to skim through a procedure (so you will know what is coming) before you actually do each step.

No two readers will use this book in exactly the same way. Some readers will prefer reading or skimming the chapters and appendices sequentially to become thoroughly familiar with the card.

Other readers will want to read the first two chapters and then skip to whatever chapter or appendix is of particular interest.

Summary of Contents

The contents of this guide are summarized below.

Preface describes how this manual is organized.

Chapter 1 contains an overview of the installation procedure.

Chapter 2 describes general installation instructions. It also describes the necessary tools and software.

Chapter 3 describes how to install the GX card in a Sun SPARCstation 1, SPARCstation 1+, and SPARCstation 2 Workstation.

Chapter 4 describes how to install the GX card in a SPARCstation IPC and IPX Workstation.

Appendix A contains servicing and ordering information.

Appendix B describes how to configure your system using GX card. It explains how to attach multiple monitors. In addition, it contains a list of monitors supported by the GX.

Appendix C describes SBus signals and monitor cable signals.

Appendix D describes the troubleshooting procedures. It also describes how to run Sundiag.

Appendix E contains GX specifications.

Relevant Documents

Documents that contain information applicable to or which have been referred to in this document are listed below.

Part Number	Description
800-4036	*SPARCstation 1 Installation Guide.* Describes how to install the SPARCstation 1.
800-4098	*SPARCstation 1 Sun System & Network Manager's Guide.* Describes the system and network management tasks for maintaining a single Sun Workstation or a network of several Sun Workstations.
800-4102	*SPARCstation 1 Sun System User's Guide.* Describes the basics of using the Sun system.
800-4784	*SPARCstation 1+ Installation Guide.* Describes how to install the SPARCstation 1+.
800-4851	*SPARCstation 1+ Sun System & Network Manager's Guide.* Describes the system and network management tasks for maintaining a single Sun Workstation or a network of several Sun Workstations.
800-4826	*SPARCstation 1+ Sun System User's Guide.* Describes the basics of using the Sun system.
800-5565	*SPARCstation IPC Installation Guide.* Describes how to install the IPC Workstation.
800-5416	*SPARCstation IPC System & Network Manager's Guide.* Describes the system and network management tasks for maintaining a single Sun Workstation or a network of several Sun Workstations.
800-*4826*	*SPARCstation IPC System User's Guide.* Describes the basics of using the Sun system.
800-5772	*SPARCstation IPX Installation Guide.* Describes how to install the IPX Workstation.

800-5702	*Sun System & Network Manager's Guide.* This manual is part of the SPARCstation IPX Manual Set which describes the system and network management tasks for maintaining a single Sun Workstation or a network of several Sun Workstations.
800-5703	*Sun System User's Guide.* This manual is part of the SPARCstation IPX Manual Set which describes the basics of using the Sun system.
800-5035	*SPARCstation 2 Installation Guide.* Describes how to install the SPARCstation 2 Workstation.
800-5416	*SPARCstation 2 System & Network Manager's Guide.* Describes the system and network management tasks for maintaining a single Sun Workstation or a network of several Sun Workstations.
800-4826	*SPARCstation 2 System User's Guide.* Describes the basics of using the Sun system.
800-4251	*Open Boot PROM Toolkit User's Guide* which describes how to use your system's open boot PROM. This guide is for system administrators, software or hardware developers, and advanced users.
800-5674	*Open Boot PROM 2.0 Toolkit User's Guide* which describes how to use your system's 2.0 open boot PROM. This guide is for system administrators, software or hardware developers, and advanced users.

Typographic Conventions

This book uses a number of typographic conventions:

Italic font is used for titles of books or to give special emphasis. For example: When you press the switch, the power goes *on*.

- `Courier font` indicates messages or prompts from the system that appear on your screen. For example:

```
Configuration successfully completed.
```

It is also used to represent SunOS commands, such as:

Use the `stty` command.

In addition, **`courier bold`** is used within text instructions to indicate characters or words that you type. For example:

- **`Courier bold`** font is used in screen examples to show what you type. For example:

```
nevada% passwd
```

A rectangular box around text indicates a key that you press. For example:

Press the Return key.

When you see two key names within one rectangular box, press and hold the first key, then type the second character. For example:

To press [L1-A], press and hold [L1], and then type a lowercase a.

Audience

This *GX Installation Guide* is for those of you who will physically connect the GX card to the SPARCstation CPU board. You should be somewhat familiar with working on computers, but by no means do you need to be a computer expert to use this book.

Introducing the GX

The GX is a single-wide graphics accelerator card which is installed in an SBus-based SPARCstation. This guide contains installation instructions for the GX graphics accelerator card.

1.1 Systems Covered

The installation procedures described in this guide cover the following Sun systems:

- SPARCstation 1
- SPARCstation 1+
- SPARCstation IPC
- SPARCstation IPX
- SPARCstation 2

Refer to paragraph 2.4 for System Requirements.

1.2 Installation and ESD Kit

This kit includes the following:

- GX graphics accelerator card (inside an anti-static envelope)
- ESD (electrostatic discharge) kit which consists of an anti-static mat and the wrist strap. The wrist strap is a disposable one piece design which attaches by adhesive to electrical ground and the installer.
- *GX Installation Guide*

1.3 Installation Cautions

Be sure to carefully read and follow the cautions below before beginning the installation procedure. Failure to comply may result in damage to the equipment.

Caution – Do not open the anti-static envelope containing the GX card until instructed to do so.

Caution – Circuit board components are vulnerable to damage by electrostatic discharge (ESD). An electrostatic charge can build up on the human body and then discharge when you touch a board. Such discharge can be produced by walking across a carpet and touching a board, or by other similar cause. Before handling any board, wear an anti-static device (wrist strap) to discharge the static electricity present in your body. Refer to paragraph 3.6 that describes how to attach a wrist strap.

To minimize risk of ESD damage, do the following:

– Handle boards by the edges only.

– Store boards in anti-static bag provided.

– Use a wrist strap and SunESD mat (Part Number 250-1088) whenever you work on a board. (Instructions are printed on the mat.)

General Installation Instructions

2.1 Overview

This chapter describes general instructions for installing the GX card into different SPARCstations.

Chapters 3 and 4 describe how to install the GX card into different SPARCstations. We recommend that you read the *Installation Guide* that came with your system for detailed information.

You should allow about 30 to 60 minutes to complete the installation.

2.2 Tools Needed

The GX installation procedure for the SPARCstations does not require any special tools. You only need the following tools:

1. Medium size Phillips screwdriver #2
2. Medium size flat screwdriver #2
3. ESD kit (provided)

2.3 *Software Requirements*

The GX requires **SunOS** 4.0.3 or higher revision level to run single GX configuration. To run multiple GX configurations, you need **SunOS** 4.1.1. If you need to run Sundiag in a multiple GX configuration, you need 4.1.1–GFX Rev 2 or higher. If you do not have the appropriate **SunOS** revision, contact your local Sun Sales Representative to obtain the necessary software upgrade.

Note – You need 4.1.1–GFX Rev 2 only if you need to run Sundiag in a multiple GX configuration mode. It is not required to bring up your GX or run any applications.

If you need help with software or problems related to the GX installation, call Sun Microsystems at **1-800-USA-4SUN**.

2.4 *System Requirements*

Note – Multiple GX cards are not supported on SPARCstation 1, SPARCstation 1+, and SPARCstation IPC. Refer to Appendix B Configuration Options for information on multiple GX cards configuration.

- SPARCstation 1 (boot PROM version 1.0 or higher)
- SPARCstation 1+ (boot PROM version 1.3 or higher)
- SPARCstation IPC (boot PROM version 1.6 or higher)
- SPARCstation IPX (boot PROM version 2.x or higher)
- SPARCstation 2 (boot PROM version 2.x or higher)

2.5 *Verifying Your SunOS Release Number*

Enter the following to find out if you have the right SunOS release number:

```
example% cat /etc/motd
```

Your Sun OS release number will be displayed.

2.6 *Refresh Rate for Monitors*

The GX automatically selects 76 Hz refresh rate (frequency) upon initialization if it is supported by the monitor. The GX will initialize at 66 Hz refresh rate if a 66 Hz monitor is attached to the system.

Installing the GX in a SPARCstation 1, 1+, and 2

3

3.1 *Overview*

This chapter describes how to install the GX card into a Sun SPARCstation 1, SPARCstation 1+, and SPARCstation 2 workstation. If powering down the system affects other users or clients, the system administrator should warn them that the system is about to be powered down.

Note – The installation examples shown in this chapter are for the SPARCstation 2. However, the GX installation procedure covered in this chapter also applies to the SPARCstation 1 and SPARCstation 1+. The internal component layout of the SPARCstation 2 is slightly different from that of the SPARCstation 1 and SPARCstation 1+, but it does **not** affect the GX installation procedure in any manner.

3.2 *Installation Summary*

It will take you about 30 to 60 minutes to complete the installation. The following is an overview of the installation steps:

1. **Shut down the system.**
2. **Remove the monitor.**
3. **Remove the top cover.**

4. **Attach the wrist strap.**
5. **Select the SBus slot.**
6. **Remove the SBus filler plate.**
7. **Install the GX card.**
8. **Replace the top cover.**
9. **Power up the system.**

Tools Needed

The following tools are needed to install the GX card.

1. Medium-size Phillips screwdriver #2
2. Medium-size flathead screwdriver #2
3. ESD kit (provided)

3.3 *Before Shutting Down the System Unit*

You need to turn off the power to the system unit before opening it. You should save all your work before stopping the system. For information about how to save your work, refer to the *Sun System User's Guide* that came with your system.

3.4 *Shutting Down the System*

It is assumed that you have read Chapter 2, "General Installation Instructions". Refer to the *Installation Guide* that came with your system for additional information.

Before you attempt to install a new GX card or replace an existing card, make sure you have the right card with a single Sbus connector. It is assumed that one SBus slot is available in the system.

To Shut Down the System

You MUST halt SunOS before turning off the system power to ensure that the data in the buffers is written to the disk before the SunOS operating system halts. The shut down procedure is different for a single system and a networked system. Refer to your system *Installation Guide* for details. The following shut down procedure applies only if you have a single system.

1. **Enter the superuser mode from the console keyboard by typing:**

```
example% su
```

2. **When requested, type in your superuser password. The password does not appear on the screen.**

```
example% su
Password:
```

3. **As a superuser, halt SunOS by entering /etc/halt.**

```
example% su
Password:
example# /etc/halt
```

If you are unable to become superuser, see your System Administrator.

When SunOS is halted, do the following:

1. **Turn off the monitor power.**
2. **Turn off the system power by pressing the O on the system unit's power on/off switch.**

Removing the Monitor

Remove the 13W3 cable from the system unit. The 13W3 cable is attached to an SBus card. (Refer to your system *Installation Guide* for the locations of all the ports and connectors.) Remove the monitor from the system enclosure and put it aside.

Warning – After the monitor is turned off, there is a residual charge of static electricity built up on the monitor's picture tube. The monitor power cord should be left connected at least one minute to allow static discharge after turning off the monitor power. Lifting the monitor too soon after turning off the power may result in static discharge to the body which may cause you to *drop* the monitor. Please note, a 19"color monitor may weigh as much as 75 pounds. Get someone's help if you cannot move it easily.

Do not disconnect the power cord from the system unit. Connection to the power outlet provides the ground path necessary to safely install the GX card.

Before Handling Internal Components

It is important to keep in mind that many of the internal components of the system unit are delicate and sensitive to electricity. The anti-static wrist strap should be attached to your wrist and to a bare metal portion of the system unit chassis, such as the power supply, before handling any of the boards or internal components. You will not shock yourself by putting it on. Failure to comply may result in permanent damage to a card or system.

Caution – Handle cards only by the non-conductive edges. To avoid damage to the card, do not touch the components on the cards or any metal parts. Make sure the system power is turned off and the power switch is in the "OFF" position. Also make sure that the green light-emitting diode (LED) at the front of the system is not lit.

3.5 *Removing the Cover*

Follow these steps to open the system unit. Figure 3-1 shows how to remove the system unit cover.

1. **Remove the monitor from the system unit (if placed on the system) and put it aside. Get someone's help if necessary. Beware of the static discharge from the monitor's face.**

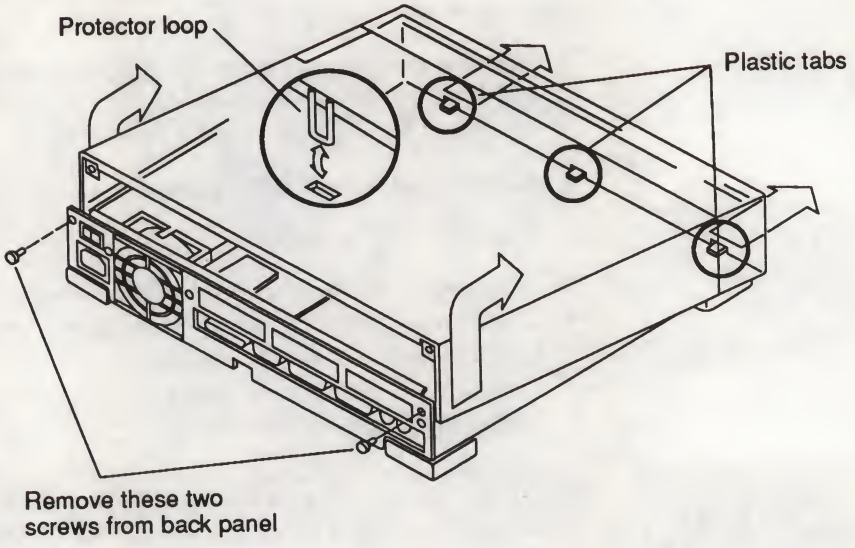
2. **Remove the top cover of the workstation to access the CPU board:**

Do the following in sequence:

- Remove the two screws holding the cover to the back panel.
- Grasp the sides of the cover from the rear and tilt the cover until the protector loop clears the chassis.
- Gently push the cover forward about one-half inch (13 mm) so that the plastic tabs clear the chassis.

Caution – The plastic tabs at the bottom of the top cover are fragile. Be sure the tabs clear the chassis before removing the cover.

Figure 3-1 Removing the System Unit Cover



3.6 *Attaching a Wrist Strap*

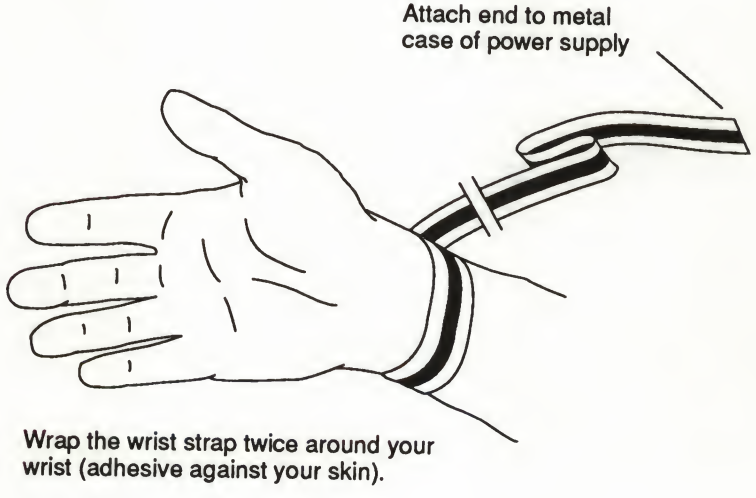
A wrist strap is a device that provides grounding for static electricity between your body and the chassis of the system unit. See Figure 3-2.

Caution – Cards, modules, and components can be damaged by harmful electrical charges if you do not wear a wrist strap.

To use a wrist strap:

1. **Wrap the grounding strap with the conductive adhesive tape twice around your wrist. Make sure the adhesive side is against your skin.**
2. **Attach the other end with the adhesive copper strip to the metal case of the power supply.**

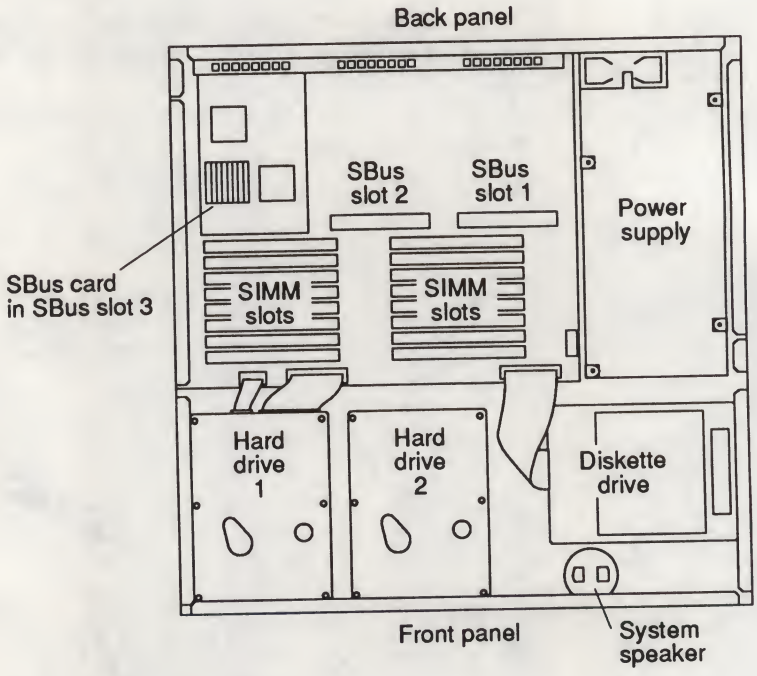
Figure 3-2 Attaching the Wrist Strap



3.7 *Selecting an SBus Slot*

Figure 3-3 shows the SBus slots and the internal view of the system. Three SBus slots are available inside the SPARCstation 2, SPARCstation 1 and SPARCstation 1+: SBus slot 1, SBus slot 2, and SBus slot 3. GX can be installed in any available slot. No jumper configuration is necessary.

Figure 3-3 SBus Slots



3.8 *Installing the GX Card*

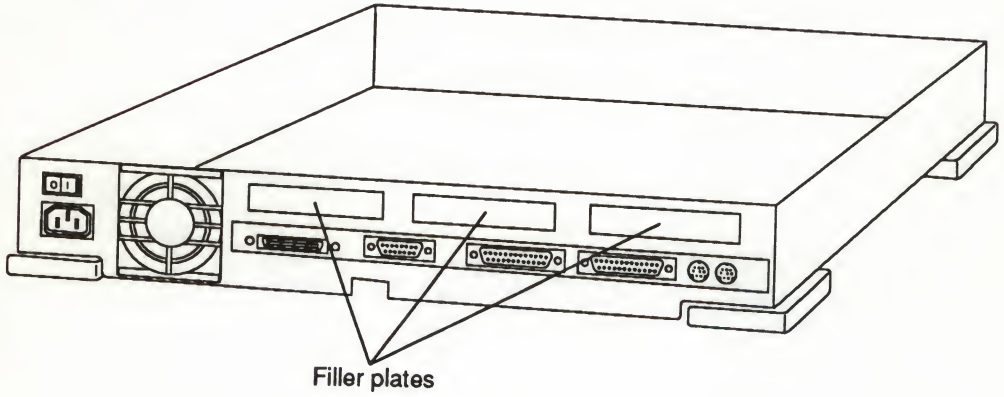
It is assumed that the system unit is open. Before you begin the installation, make sure the system power is turned off and the wrist strap is attached to your body and the metal case of the power supply as described earlier. Use the following procedure to install the GX:

Note – If you are replacing an existing double-wide SBus GX card with this GX card, you will need a filler plate (Sun part number 340-1763) to cover the hole in the rear panel. Contact your Sun sales representative about obtaining a filler plate. Removal of a filler plate (Step 1 below) is not necessary if you are replacing a single-wide SBus card with a GX card.

---

1. **Using a Phillips screwdriver, remove the desired SBus slot filler plate from the inner surface of the back panel as shown in Figure 3-4. Release the two clips at the bottom of the filler plate which hold the plate to the system unit's back plate. Locate any available slot in the system for the GX card. Figure 3-5 shows the GX card.**

Figure 3-4 Filler Plates



2. **Slide the SBus card at an angle into the back panel of the system unit making sure the mounting plate tabs of the card are engaged in the rear panel of the system unit. See Figure 3-6.**

3. **Align the GX card's 96-pin connector with the corresponding SBus slot and gently press it into the socket. See Figure 3-6. Make sure the GX card is seated properly and there is no visible gap between the GX connector and the SBus slot.**

Caution – Do not use excessive force or push on the SBus card retainer to avoid any damage to the card or the card retainer.

Figure 3-5 GX Card

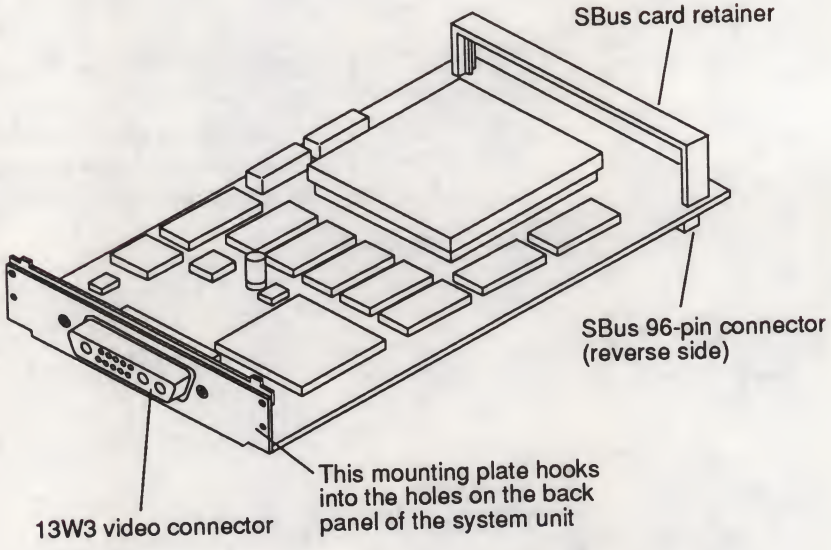
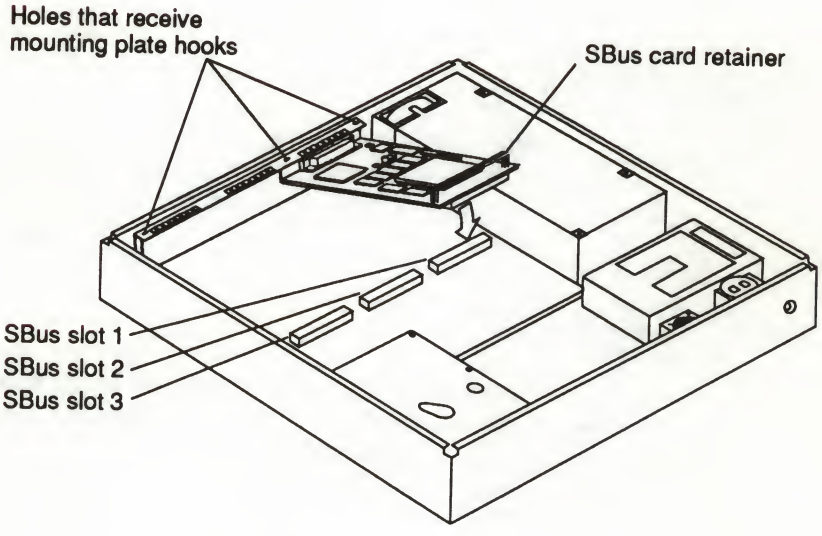


Figure 3-6 Installing the GX Card



4. **Replace the system enclosure cover reversing the removal procedure.**
5. **Connect the monitor cable to the GX 13W3 video connector making sure that the two locking screws on the cable are tightened.**
6. **Turn the system power ON and check for proper operation of the system unit and the installed card.**

For additional information, refer to "Powering Up Your System" in Chapter 3 and 4 (for single systems and networked systems, respectively) of your system *Installation Guide.*

Warning – Before powering up your system again, be sure to replace the top cover using the procedure described in the *Installation Guide* of your system. It is unsafe to operate the system without its top cover in place. Failure to comply may result in personal injury and system damage.

Note – The 13W3 D-shell connector cable (part number 530-1440-02) has toroids for reduction of RFI (radio frequency interference). For regulatory compliance reasons, you must use this cable to connect the GX to the monitor.

3.9 *Removing the GX Card*

Before performing this procedure make sure that power is turned off, the system cover is removed, and the GX monitor cable is not attached. To remove the card, gently pull it upwards using the card edges and disengage the tabs from the back panel. (Reverse the installation procedure shown in Figure 3-6.)

3.10 *Error Messages*

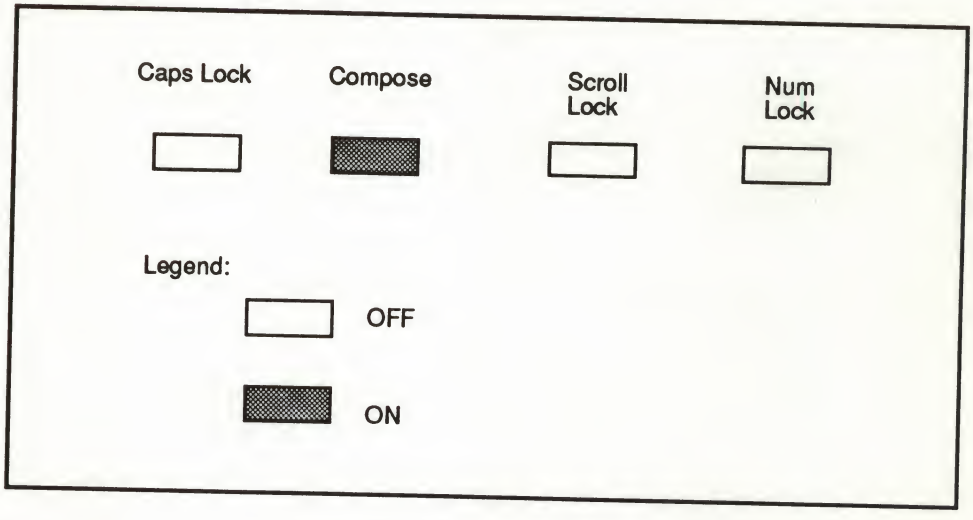
Error messages may be displayed due to a variety of reasons. If the installation is done properly, the Sun logo and a test message will appear on the screen within 30 seconds after power up. It indicates that GX installation has been successful.

SPARCstation 2 Keyboard Error Messages

The SPARCStation 2 has power on self-tests that are executed automatically each time the system is turned on. These tests must be successful in order for the system to display the start-up banner on your monitor. If one of these tests fail, it is indicated by the light-emitting diodes (LEDs) on the SPARCstation 2 keyboard. For interpretation of the keyboard failure messages, refer to the "Keyboard LED Diagnostics" Chapter in the *SPARCstation 2 Installation Guide.*

If all of the SPARCstation 2 power on self-tests run correctly (no LEDs are on), but there is still no start-up banner, this could be an indication of a frame buffer, monitor, or video cable failure. Refer to Appendix D, "Troubleshooting" for information on how to determine which part of the graphic subsystem has failed.

Figure 3-7 SPARCstation 2 Keyboard LED Messages



Note – Keyboard error messages are not supported on SPARCstation 1 and 1+.

System LED

If the system LED (green light at the front of the system) is on, it means that the power is available to the system. The system LED flashes while the power-on diagnostics are being run. However, if the system LED flashes for more than 30 seconds, it means the keyboard is not attached. If the system LED is OFF, there could be a system processor problem, a power supply failure, or the power switch is not turned ON.

3.11 *Advanced Diagnostics*

Sundiag is a diagnostic tool that can be used to verify the configuration, functionality, and reliability of most Sun hardware controllers and devices. This tool is available to every user under SunOS. The program may be found under the `/usr/diag/sundiag` directory if diagnostics were loaded during

software installation. Refer to Appendix D for troubleshooting procedures which also describes how to run Sundiag. Refer to *Sundiag User's Guide* (800-3818) for details.

Installing the GX in a SPARCstation IPC and IPX

4

4.1 *Overview*

This chapter describes how to install the GX card into a SPARCstation IPC and an IPX Workstation. The GX card plugs into one of the SBus slots of the main logic board (CPU board) of the SPARCstation IPC and IPX Workstation. Before the GX can be installed, the system needs to be powered down. If powering down this system affects other users or clients, the system administrator should warn them that the system is about to be powered down. For details, refer to *Sun System & Network Manager's Guide* which came with your system.

4.2 *Installation Summary*

Note – The installation examples shown in this chapter are for the SPARCstation IPC. However, the GX card installation procedure covered in this chapter also applies to the IPX system. The internal component layout of the IPX system is slightly different from that of the IPC, but it does not affect the GX installation procedure in any manner.

The SPARCstation IPC and SPARCstation IPX have two SBus slots. The GX card can be installed in any available SBus slot. You should allow about 30 to 60 minutes to complete the installation. The following is an overview of the installation steps:

1. **Shut down the system.**

2. **Remove the monitor and disconnect the monitor cable.**
3. **Open the system unit.**
4. **Attach the wrist strap.**
5. **Select the SBus slot.**
6. **Remove the SBus filler plate.**
7. **Install the GX card.**
8. **Close the system unit.**
9. **Power up the system.**

4.3 *Tools Needed*

The following tools are needed to install the GX card.

1. Medium-size Phillips screwdriver #2
2. Medium-size flathead screwdriver #2
3. ESD kit (provided)

4.4 *Before Opening the System Unit*

You need to turn off the power to the system unit before opening it. You should save all your work before stopping the system. For information on how to save your work, refer to the *Sun System User's Guide* that came with your system.

4.5 *Shutting Down the System*

It is assumed that you have read Chapter 2, "General Installation Instructions".

Before you attempt to install a new GX card or replace a defective or existing card, make sure that you have the right card with a single connector. The GX card occupies only one slot on the main logic board. Also make sure that there is a slot available in the system.

To Shut Down the System

You MUST halt SunOS before turning off the system power to ensure that the data in the buffers is written to the disk before the SunOS operating system halts. The shut down procedure is different for a single system and a networked system. Refer to the *SPARCstation IPC Installation Guide* for details. The following shut down procedure applies only if you have a single system.

1. **Enter the superuser mode from the console keyboard by typing:**

```
example% su
```

2. **When requested, type in your superuser password. The password does not appear on the screen.**

```
example% su
Password:
```

3. **As a superuser, halt SunOS by entering /etc/halt.**

```
example% su
Password:
example# /etc/halt
```

If you are unable to become superuser, see your System Administrator.

When SunOS is halted, do the following:

1. **Turn off the monitor power.**
2. **Turn off the system power by pressing the O on the system unit's power on/off switch.**

4.6 *Removing the Monitor*

Disconnect the monitor AC power cord and the 13W3 cable from the system unit. The 13W3 cable is attached either to the on-board frame buffer of the CPU board or to an SBus card. (Refer to the *SPARCstation IPC Installation Guide* for the locations of all the ports and connectors.) Remove the monitor from the system enclosure and put it aside.

Warning – After a monitor is turned off, there is a residual charge of static electricity built up on the monitor's picture tube. The monitor power cord should be left connected at least one minute to allow static discharge after turning off the monitor power. Lifting the monitor too soon after turning off the monitor may result in static discharge to the body which may cause you to *drop* the monitor. Please note, a 19" color monitor may weigh as much as 75 pounds. Get someone's help if you cannot move the monitor easily.

Do not disconnect the power cord from the system unit's power outlet. Connection to the power outlet provides the ground path necessary to safely install the GX card.

4.7 *Before Handling Internal Components*

It is important to keep in mind that many of the internal components of the system unit are delicate and sensitive to electricity. The anti-static wrist strap should be attached to your wrist and to a bare metal portion of the system unit chassis, such as the power supply, before handling any of the boards or internal components. You will not shock yourself by putting it on. Failure to comply may result in permanent damage to a board.

Caution – Handle cards only by the non-conductive edges. To avoid damage to the card, do not touch the components on the cards or any metal parts. Make sure the system power is turned off and the power switch is in the "OFF" position. Also make sure that green light-emitting diode (LED) at the front of the system is not lit.

4.8 *Opening the System Unit*

Figure 4-1 shows how to detach the top and bottom sections of the system unit. The latch buttons at the sides allow the two sections to disengage.

To Open the System Unit

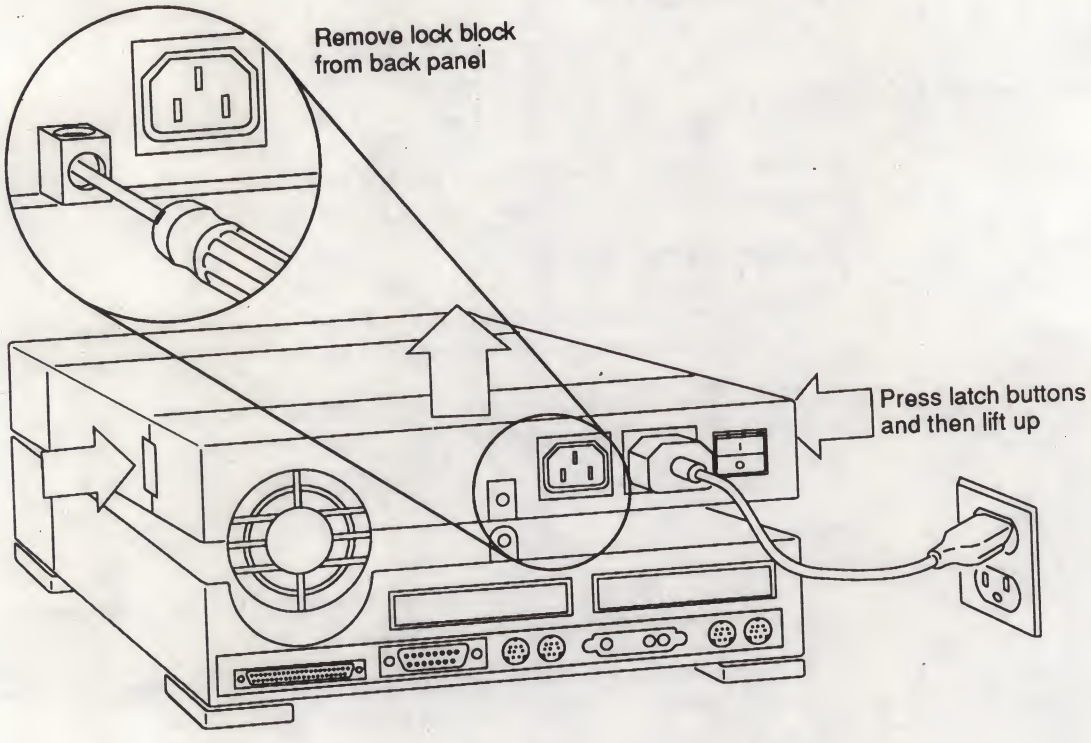
1. **Place the system unit on a work table that has enough space to lay the top and bottom sections of the unit flat.**
2. **Make sure that the power is turned off to your system unit, but that the power cord remains plugged into the system unit and to the power source.**
3. **Lift the top section of the system unit.**

Do the following in sequence:

   a. **Remove the screw holding the lock block on the back panel. Use a Phillips screwdriver (see Figure 4-1).**
   b. **Position the system on the table so that there is enough space to lay the top section of the unit flat in front of the bottom.**
   c. **Grasp the unit top with your fingers over the latch buttons at the sides and apply downward pressure on the top using your thumbs or palms. Depress the latch buttons and while holding them down, lift the top (see Figure 4-1).**
   d. **Rotate the unit top up and towards the front panel. Lay unit top flat on the table. The unit top and bottom are still connected by the power and data cables coming from the disk drive(s) and power supply in the unit top to main logic board in the unit bottom.**

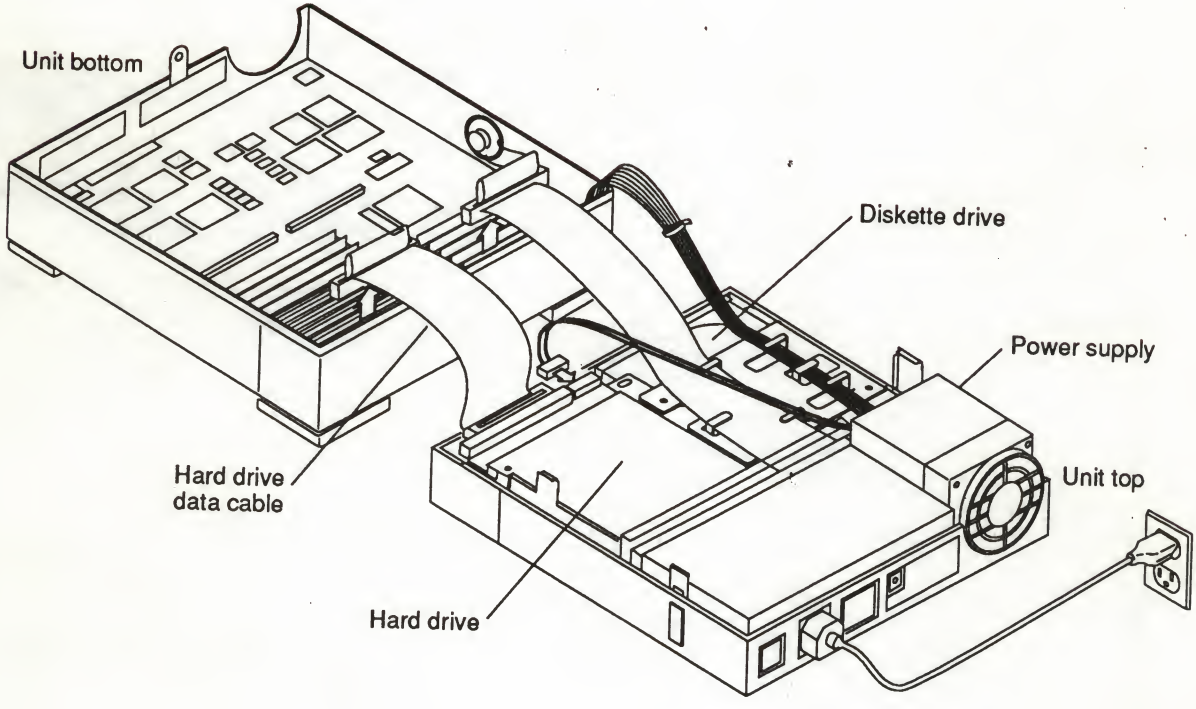
Note – The unit top contains the power supply and disk drive(s) and is the heavier of the two sections. Figure 4-2 shows how an open system unit looks.

Figure 4-1 Opening the SPARCstation IPC System Unit



Warning – Do not power up the system unit without closing it. Failure to do so may result in physical injury and system damage.

Figure 4-2 An Open SPARCstation IPC System Unit.



4.9 *Attaching a Wrist Strap*

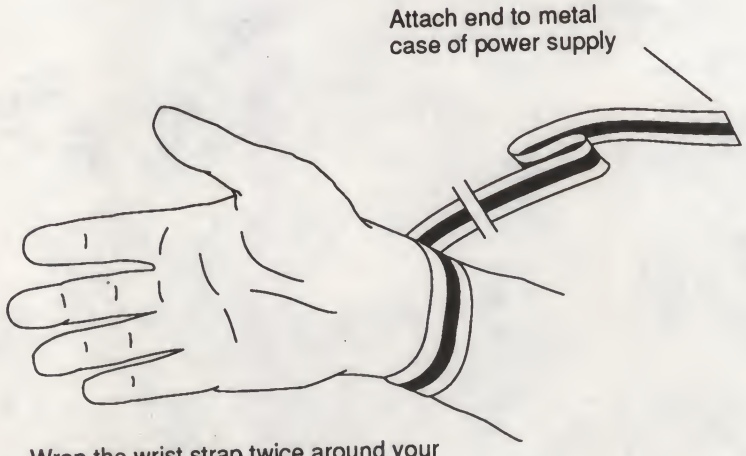
A wrist strap is a device that provides grounding for static electricity between your body and the chassis of the system unit. See Figure 4-3.

Caution – Cards, modules, and components can be damaged by harmful electrical charges if you do not wear a wrist strap.

To use a wrist strap:

1. **Wrap the grounding strap with the conductive adhesive tape twice around your wrist. Make sure the adhesive side is against your skin.**
2. **Attach the other end with the adhesive copper strip to the metal case of the power supply in the top section of the system unit.**

Figure 4-3 Attaching the Wrist Strap



4.10 Selecting an SBus Slot

The corresponding filler plate needs to be removed before you can install the GX card. See Figure 4-4. Figure 4-6 shows the SBus slots and the internal view of the lower part of the system where the GX is installed. Two SBus slots are available inside the SPARCstation IPC system: SBus slot 1 and SBus slot 2. The GX can be installed in any available slot. No jumper configuration is necessary.

Removing the Filler Plate

Using a flathead screwdriver, release the two clips at the bottom of the filler plate which hold the plate to the system unit's back panel. See Figure 4-4.

Figure 4-4 Removing the Filler Plate

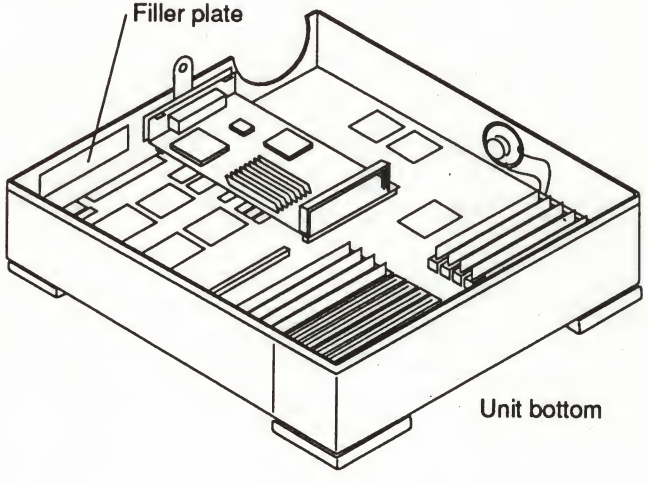
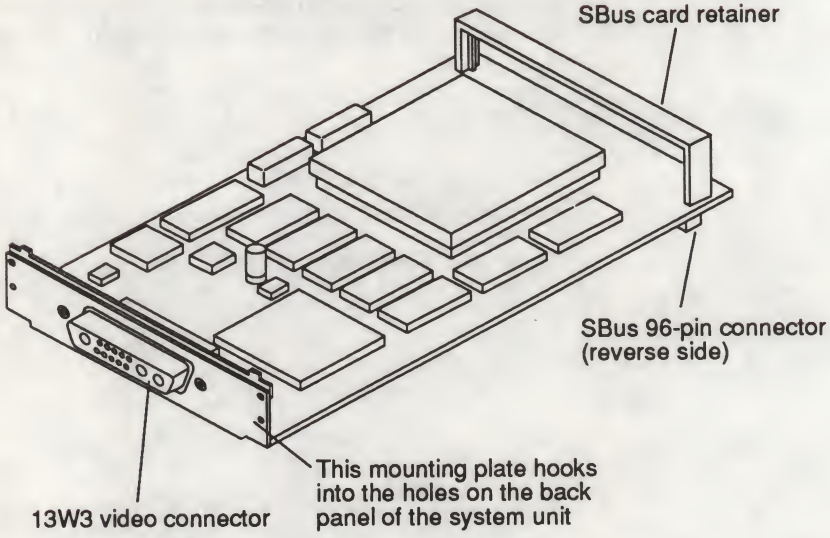


Figure 4-5 shows the GX card.

Figure 4-5 GX Card



4.11 *Installing the GX Card*

It is assumed that an SBus slot is available. You can plug an SBus card into either slot 1 or slot 2 as described earlier in this chapter.

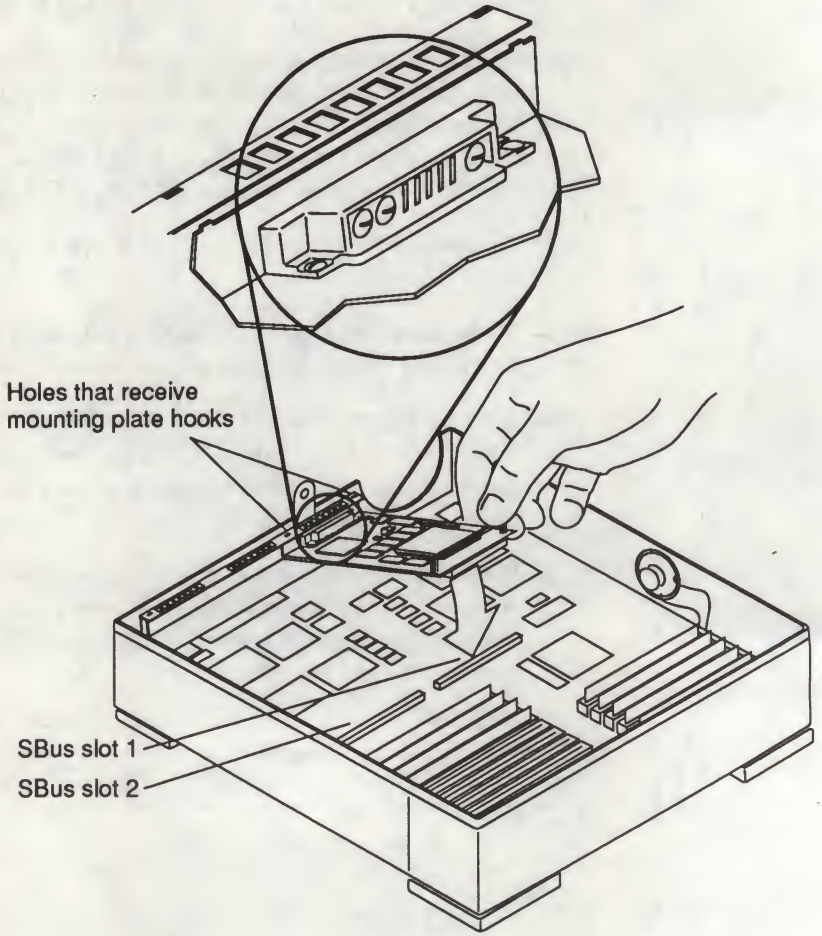
Note, if you are replacing an existing double-wide SBus GX card with this GX card, you will need a filler plate (Sun part number 340-1763) to cover the hole in the rear panel. Contact your Sun sales representative about obtaining a filler plate. Removal of a filler plate (Step 1 below) is not necessary if you are replacing a single slot SBus card with a GX card.

It is assumed that the system unit is open. To install the GX card in the system unit:

1. **Make sure the system is turned off and the wrist strap is attached to your body and the metal part of the power supply as described earlier.**
2. **Line up the rear of the GX card with the back panel of the SPARCstation IPC. Slide the GX card's 13W3 connector through the rear panel at an angle. Make sure the mounting plate tabs are engaged in the rear panel holes. See Figure 4-6.**
3. **Holding the GX card in place against the back panel, align the GX card's connector with the main logic board's corresponding SBus slot (see Figure 4-6) and gently press the GX card from the corners to insert the card connector into the slot.**

Caution – Do not use excessive force or push on the SBus card retainer to avoid any damage to the card or the card retainer.

Figure 4-6 Installing the GX Card on the SPARCstation IPC Main Logic Board



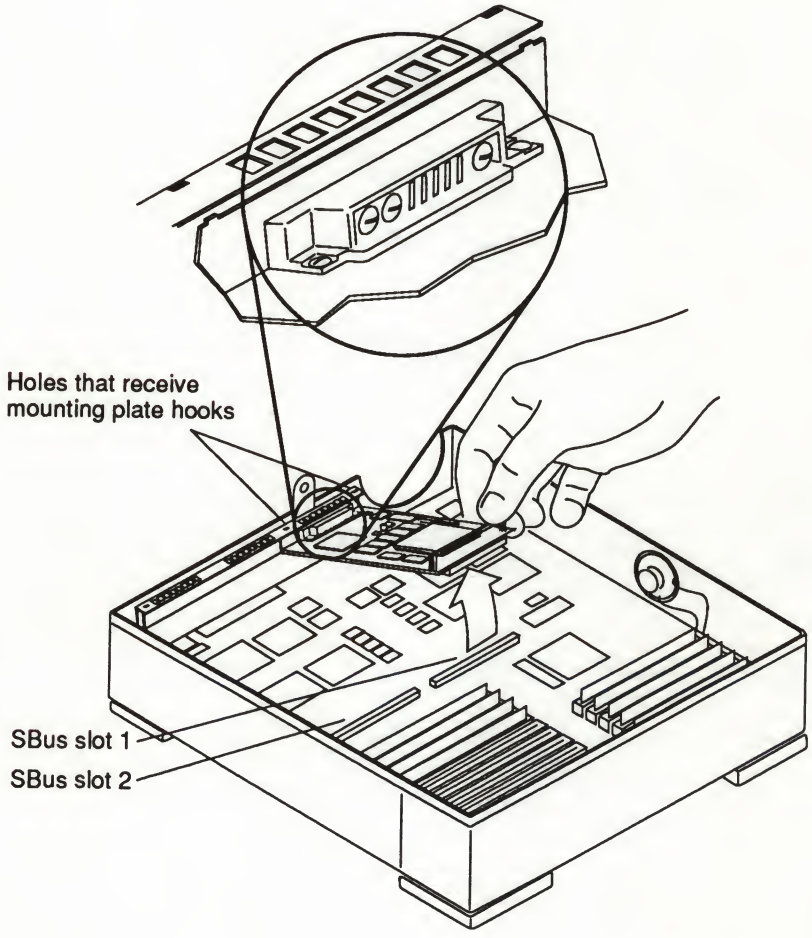
Note – The 13W3 D-shell connector cable (Part Number 530-1440-02) has toroids for reduction of RFI. For regulatory compliance reasons, you must use this cable to connect the GX to the monitor.

4.12 *Removing the GX Card*

Before performing this procedure make sure that power is turned off, the system cover is removed, and the GX monitor cable is not attached. To remove the card, gently pull it upwards using the card edges and disengage the tabs from the back panel. (Reverse the installation procedure shown in Figure 4-6.)

Figure 4-7. shows how to remove the GX card.

Figure 4-7 Removing the GX Card



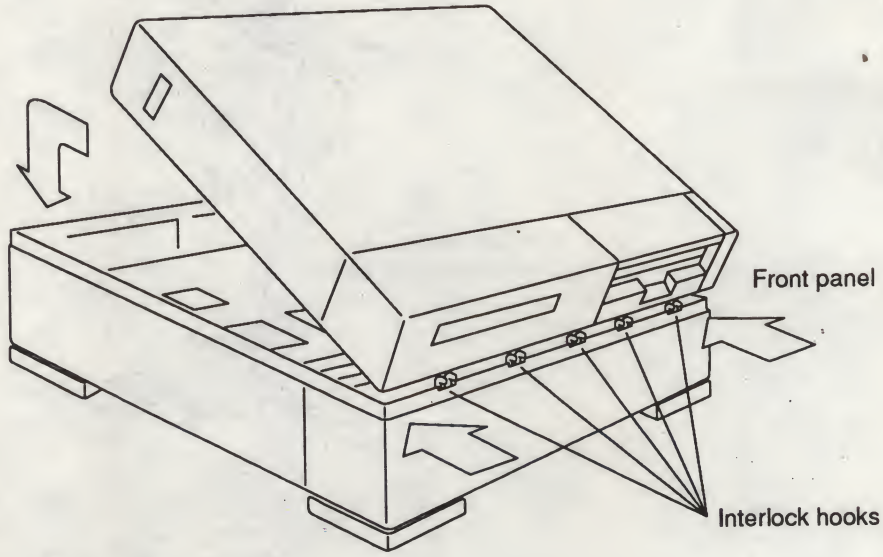
4.13 *Closing the System Unit*

To close the System Unit:

1. **Grasp the front of the unit near the power supply as shown in Figure 4-8. Tilt the unit top at a 45 degree angle and rotate your hand position so that the thumbs and fingers point up and the five interlock hooks can be lined up.**

Note – The interlock hooks in the front do not touch until the system is lowered to a 45 degree angle.

Figure 4-8 Closing the System Unit



2. **Rest the front edges together to connect the interlock hooks by pulling gently towards the back of the unit. As you lower the unit top, continue to pull gently back to secure the connection. The unit top will rest slightly forward. Push unit top gently back a few millimeters. The latch buttons should click, securing the unit top to the unit bottom.**
3. **Attach the lock block by inserting the screw through the lock block on the outside and driving the screw through the security loop and into the power supply. Tighten the screw with a Phillips screwdriver. Be careful not to overtighten the screw as excessive force may strip the screw.**
4. **Connect the monitor cable to the monitor and the GX connector.**

4.14 *Powering up the System*

Power up the system. Refer to the *SPARCstation IPC Installation Guide* for power up procedure if your system is part of a network. If you have external drives, refer to the manuals that came with them for the correct procedures for powering up the external drives.

Warning – Do not power up the system unit without replacing the top section and securing it. Failure to take this precaution may result in personal injury and system damage.

4.15 *Advanced Diagnostics*

Sundiag is a diagnostic tool that can be used to verify the configuration, functionality, and reliability of most Sun hardware controllers and devices. This tool is available to every user under SunOS. The program may be found under the `/usr/diag/sundiag` directory if diagnostics were loaded during software installation. Refer to Appendix D for troubleshooting procedures which also describes how to run Sundiag. Refer to *Sundiag User's Guide* (800-3818) for details.

Servicing and Ordering Information

A.1 Field Replacement Units

The GX does not have any field replacement components, rather the card assembly is a field replaceable unit (FRU). If the GX is defective, it should be replaced with a new one.

If a unit is defective and under warranty, call 1-800-USA-4SUN if you are within the USA. Also call that number (within the USA) if you want the unit to be repaired.

A.2 Ordering the GX

If you need a new unit, call Sun Sales/Telemarketing. Table A-1 shows the description and part numbers of the FRUs.

Table A-1 Field Replacement Units

Description	FRU Number
GX Card	501-1672-01
Video Cable	530-1440-02

A.3 Getting Help

Sun Microsystems has Answer Centers available throughout the world for questions about both software and hardware. Table A-2 contains the phone numbers for these Answer Centers. When you call, please have your system's model number, serial number, and SunOS release number ready to give to the dispatcher.

You can also send questions by electronic mail to `sun!hotline`. Be sure your mail message includes your name, company, and phone number, along with the information listed above. If you have questions about Sun's support services or your shipment, call your sales representative.

Table A-2 Sun Answer Centers

Country	Service Region	Answer Center Number
Australia	Sun Australia	(2) 436-4699
Belgium	lieven Jaspaert	+32-27303811
	Sun Microsystems Belgium	
Canada		
Central Region:	Ontario	1-800-263-1680
	Ottowa	(613) 723-8510
	Toronto Branch	(416) 490-9490
	Markham (National CSD and Education	(416) 477-6745
Eastern Region:	New Brunswick, Newfoundland, Nova Scotia, Prince Edward Island, Quebec, Montreal	1-800-261-1554
Prairies Region:	Saskatchewan, Manitoba	1-800-661-9256 or (403) 262-6722
Western Region:	Alberta	1-800-661-3643
	Edmonton	(403) 482-7264
	Calgary	(403) 262-6772
	British Columbia	1-800-663-0440
	Vancouver	(604) 684-4120
European Headquarters	Surrey (UK) Sun Microsystems Europe Inc.	+44 0276 51440
Finland	Espoo Sun Microsystems Oy	358 05022700
France	Velizy Villacoublay Cedex Sun Microsystems France S.A.	33-1-30-67-5080
Germany	Grasbrunn 1 Sun Microsystems GmbH	89/46008-350
Holland	Amersfoort Sun Microsystems Netherlands B.V.	+33-501234
Hong Kong	Sun Asia	(5) 865-1688

Table A-2 Sun Answer Centers (continued)

Country	Service Region	Answer Center Number
Italy	Milan Sun Microsystems Italia SpA	(9) 6055228
Japan	Nihon Sun	(3) 221-7021
	C. Itoh Data Systems	(3) 497-4746
Spain	Madrid Sun Microsystems Iberica SA	(1) 5550957
Sweden	Kista Sun Microsystems AB	(8) 623 9000
United Kingdom	Surrey Sun Microsystems UK Ltd.	276 51440
United States	All, including Puerto Rico	1-800-USA-4SUN 1-800-872-4786
Switzerland	Postfach Sun Microsystems (Schweiz) AG	(1) 825-7272
Countries not listed	All countries outside the USA, Europe, and Northern Africa	1-800-USA-4SUN

Note – If you do not know your Sun Sales Representative in Europe, please contact our European Headquarters at **276 51440** in the United Kingdom.

Configuration Options

B.1 General

This appendix describes how you can configure your system using a GX to suit your specific video requirements.

B.2 Systems Supported

- SPARCstation 1 (4/60)
- SPARCstation 1+ (4/65)
- SPARCstation IPC (4/40)
- SPARCstation IPX (4/50)
- SPARCstation 2 (4/75)

B.3 GX Supported Monitors for SPARCstations

Table B-1 shows the list of monitors supported by the GX.

Table B-1 Monitors Supported

Model	Sun Part Number	Type/Size/FCC	Resolution/Frequency
GDM-1604A15	365-1079-01	Color 16" FCCA	1152x900x66 US
GDM-1604B15	365-1092-01	Color 16" FCCB	1152x900x66 Hz US
GDM-1662B	365-1113-01	Color 16" FCCB	1152x900x76 Hz US
			1152x900x76 Hz OS
GDM-1955A15	365-1081-01	Color 19" FCCA	1152x900x66 US
GDM-1962	365-1095-01	Color 19" FCCA	1152x900x76 US
			1152x900x76 OS
GDM-1962B	365-1112-01	Color 19" FCCB	1152x900x76 Hz US
			1152x900x76 Hz OS
17SMM4 A	365-1100-01	Gray 17" FCCA	1152x900x76 US 1152x900x76 OS
M20P110	365-1099-01	Gray 19" FCCB	1152x900x76 Hz US
			1152x900x76 Hz OS

Switch on back of monitor: US (–) = Underscan, OS (+) = Overscan

B.4 *Recommended GX Configurations*

The following paragraphs describe different combinations of GX cards in different SPARCstations.

SPARCstation 1 and 1+ GX Configuration

One single-wide GX card or one double-wide GX card.

Note – A double-wide GX card is defined as an older version of the GX card that occupies two SBus slots. It is not a GXplus card, which also occupies two SBus slots.

SPARCstation IPC GX Configuration

Any one of the following configurations:

- One single-wide GX card
- One double-wide GX card

SPARCstation IPX GX Configuration

The SPARCstation IPX has a built-in frame buffer on the CPU board. In addition to that frame buffer, it supports the following configurations:

- Up to two single-wide GX cards
- One double-wide GX card

SPARCstation 2 GX Configuration

Any combination of the following:

- Up to three single-wide GX cards
- One single-wide GX card and one double-wide GX card.
- One single-wide GX card and one GXplus card

B.5 Multiple Monitor Configuration

Note – Multiple monitor configuration is supported only on SPARCstation 2 and SPARCstation IPX.

If you are using one of the systems noted above, you can install multiple GX cards in a system and attach more than one monitor. When the system is booted, it looks for the "sbus-probe-list" which determines the order in which the SBus devices are addressed by the system. The addressing numbers are 0, 1, 2, and 3. However, 0 is reserved for the CPU and should always be the first address in the sbus-probe-list.

Here is how you can find out the system information and sbus-probe-list:

```
nevada% eeprom
          .
          .
          .
sbus-probe-list=0123
          .
          .
```

B.6 *Changing SBus Probe List*

The following information is provided if you need to know about the polling order in case you want to change it.

The SPARCstation IPC and IPX have four SBus slots. Slot 0 is located on the main logic board and is reserved for system use. Slots 1 and 2 are for customer-installable SBus cards. Slot 1 and 2 are the only physical slots. Slot 3 is the color frame buffer on the main logic board which also supports monochrome monitors.

Note, there is no on-board frame buffer on SPARCstation 1, 1+, and 2. Slots 1, 2, and 3 in these systems are used to install SBus cards.

The polling order is determined by the `sbus-probe-list` parameter in the system's open boot PROM. This parameter is set up to poll the slots in order from 0 to 3. You can change the order of slots 1, 2, and 3, but you must begin with slot 0.

For example, if you install a frame buffer card into an SBus slot, the system automatically looks first for the frame buffer at the SBus slot rather than on the main logic board. If it finds a frame buffer at an SBus slot, the system establishes the video connection at that slot and looks no further. If you want the system to look first at the on-board frame buffer, you have to change the polling order to 0, 3, 1, 2.

Note – If you change the sbus-probe-list in an IPC or IPX system and select 3 as the console device, make sure a monitor is attached to the on-board frame buffer. Otherwise, the system will not recognize any other monitors regardless of their polling order.

The following procedure describes how to change the `sbus-probe-list`.

Caution – The procedure described below is for experienced SunOS users only. Ignore this procedure if you have only one monitor or you do not need to change the probe list. Any changes made to the system information displayed after typing the *eeprom* command described below will change the system configuration.

1. **Become superuser.**
2. **At the superuser prompt, type: eeprom sbus-probe-list=0xyz, where xyz is the number of SBus slots to be probed. For example, 0321 would cause SBus slot 3 (on-board frame buffer) to be probed first. After slot 3 is probed, SBus slots 2 and 1 will be probed, respectively.**

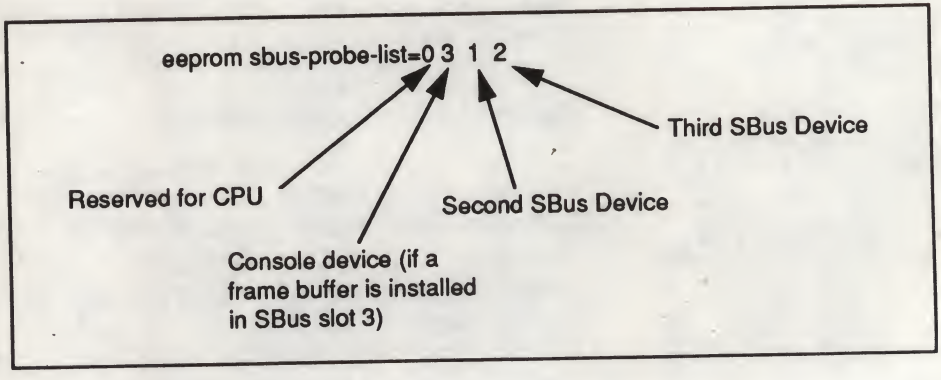
```
nevada% su
Password:
nevada# eeprom sbus-probe-list=0312
```

3. **Ignore this step if you do not care which monitor is used as a console. Remove the monitor cable from the GX card which was attached to the previous console and attach it to the new console.**

The leftmost character, except 0, in eeprom sbus-probe-list below indicates the device that will be probed first. This will be the console device regardless of its physical location.

4. **Reboot the system for the changes to take effect.**

Figure B-1 SBus Probe List Explanation



Video Cable and Interface Signals

This appendix describes the video cable and SBus interface signals.

C.1 Video Cable Signals

The Sun Class B monitor connector (13W3) is a D-type subminiature socket housing with coax cavities. See Table C-1 for details.

Table C-1 Monitor Connector Cable

Parameter	Description
Shell size	B
Arrangement	13W3
Number of contacts	10
Contact size	#20
Coax or HV cavities	3

Figure C-1 shows the Sun Class B monitor connector. The monitor side pinout is described in Table C-2.

Figure C-1 Sun Class B Monitor Connector (13W3)

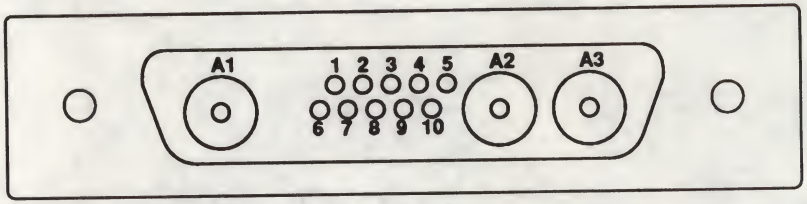


Table C-2 Monitor Side Pinout

Pin	Function	Sun Usage
A1	Red	Coaxial receptacle 75 Ohm
A2	Green	Coaxial receptacle 75 Ohm (grayscale video)
A3	Blue	Coaxial receptacle 75 Ohm
6	Reserved	N/C
2	Reserved	N/C
5	CSYNC	Combined H/V Sync
3	S2	See Table C-3.
8	S1	See Table C-3.
9	S0	See Table C-3.
4	Sreturn	Pin referenced to frame buffer ground only
1	Reserved	N/C
7	Reserved	N/C
10	Cgnd	Return for pin 5

Sreturn = Logic ground, Pin 4

N/C = Not Connected

Table C-3 shows the Sense Pin Allocation.

Table C-3 Sense Pin Allocation

Code	Scan Rate	Pin 3 Sense 2	Pin 8 Sense 1	Pin 9 Sense 0
7	No Monitor	N/C	N/C	N/C
6	1152x900 76Hz	N/C	N/C	Sreturn
5	Reserved	N/C	Sreturn	N/C
4	1152x900 76Hz	N/C	Sreturn	Sreturn
3	1152x900 66Hz	Sreturn	N/C	N/C
2	1280x1024 76Hz	Sreturn	N/C	Sreturn
1	1600x1280 76Hz	Sreturn	Sreturn	N/C
0	Reserved	Sreturn	Sreturn	Sreturn

N/C = Not Connected

Sreturn = Logic ground, Pin 4

C.2 SBus Signals

SBus is a high-performance 32-bit bus that allows add-in boards into highly integrated desktop workstations. The SBus design is for use as a motherboard bus, not as a backplane bus. It is a chip level bus which is intended for chip-level interconnections between components in microprocessor-based systems.

Table C-4 shows the signals between SBus and the GX ASIC.

Table C-4 SBus Interface Signals

Pin #	Description	Pin #	Description	Pin #	Description
01	Gnd	33	PA(06)	65	D(18)
02	BR*	34	PA(08)	66	D(20)
03	Sel*	35	PA(10)	67	D(22)
04	IntReq(1)*	36	Ack(0)*	68	Gnd
05	D(00)	37	PA(12)	69	D(24)
06	D(02)	38	PA(14)	70	D(26)
07	D(04)	39	PA(16)	71	D(28)
08	IntReq(2)*	40	Ack(1)*	72	+5V
09	D(06)	41	PA(18)	73	D(30)
10	D(08)	42	PA(20)	74	Siz(1)
11	D(10)	43	PA(22)	75	Rd
12	IntReq(3)*	44	Ack(2)*	76	Gnd
13	D(12)	45	PA(24)	77	PA(01)
14	D(14)	46	PA(26)	78	PA(03)
15	D(16)	47	Ext	79	PA(05)
16	IntReq(4)*	48	-12V	80	+5V
17	D(19)	49	Clk	81	PA(07)
18	D(21)	50	Bg*	82	PA(09)
19	D(23)	51	AS*	83	PA(11)
20	IntReq(5)*	52	Gnd	84	Gnd
21	D(25)	53	D(01)	85	PA(13)
22	D(27)	54	D(03)	86	PA(15)
23	D(29)	55	D(05)	87	PA(17)
24	IntReq(6)*	56	+5V	88	+5V
25	D(31)	57	D(07)	89	PA(19)
26	Siz(0)	58	D(09)	90	PA(21)
27	Siz(2)	59	D(11)	91	PA(23)
28	IntReq(7)*	60	Gnd	92	Gnd
29	PA(00)	61	D(13)	93	PA(25)
30	PA(02)	62	D(15)	94	PA(27)
31	PA(04)	63	D(17)	95	RESET*
32	LErr*	64	+5V	96	+12V

Troubleshooting

This Appendix describes the troubleshooting procedure. Some procedures are simple and can be performed by an average user while the others are complex and should be performed only by an experienced user.

D.1 Checking fcode-debug Parameter

Skip this information if you have not changed the fcode-debug parameter.

Note – The fcode-debug parameter is set to 'false' at the factory and does not need to be changed. If you have changed it to 'true' for CPU PROMs older than version 2.0, the system will not boot.

Refer to the following documents for details:

800-4251	*Open Boot PROM Toolkit User's Guide* which describes how to use your system's open boot PROM. This guide is for system administrators, software or hardware developers, and advanced users. Use this guide if your system boot PROM version is older than 2.0.
800-5674	*Open Boot PROM 2.0 Toolkit User's Guide* which describes how to use your system's 2.0 open boot PROM. This guide is for system administrators, software or hardware developers, and advanced users. Use this guide if your system boot PROM version is 2.0 or later.

D.2 No Video Display

This problem can occur due to a variety of reasons. If you do not see the video after booting up the system, do the following in sequence:

1. **Make sure the power is applied to the system and the SPARCstation LED and the monitor LED are lit.**
2. **Make sure the GX is installed properly and the cable is properly attached to the card and the monitor.**
3. **Verify that you have the correct monitor and the monitor cable. A 13W3 D-type monitor cable is required. Replace the monitor or the cable if necessary. Refer to Appendix B for a list of supported monitors.**

D.3 No Dark Border on the Screen

Check to see that the switch at the rear of the monitor is at Underscan (–) position. If it is at Overscan (+) position, change its position to Underscan (–).

D.4 Partly Hidden or Shifted Icons

Check to see that the switch at the rear of the monitor is at Underscan (–) position. If it is at Overscan (+) position, change its position to Underscan (–).

D.5 Resolution Problem

This problem may occur if

- No monitor was attached to the system when the power was turned on.
- Improper monitor is attached to the system.
- The monitor cable is either defective or not installed properly.
- The monitor is defective
- The GX card is defective

To solve this problem, do the following:

1. Make sure that you are using the right monitor, and that the monitor cable is installed properly.

2. Attach the proper monitor to the system and turn the CPU power Off and On.

3. If it does not resolve the problem, replace the monitor cable.

If the problem still exists, call **1-800-USA-4SUN** (within the USA) or contact your Sun Sales Representative. If you are outside the USA, contact your nearest Sun Answer Center. Refer to "Getting Help" in Appendix A. See also Table A-2 that contains phone numbers for these Answer Centers.

D.6 *Checking the System Fuses*

Note – This procedure should be performed only if the system fails to boot up after performing the procedure described in paragraph D.2

The GX does not have a fuse or a circuit breaker; it gets its power from the CPU board. If the system fails to boot and the system LED is not lit, it does not necessarily mean that the GX card is defective. There is a possibility that a system fuse is blown, or a circuit breaker is turned off. These fuses or circuit breakers should be checked. The following paragraphs describe how to check them.

SPARCstation 2 and IPX Circuit Breakers

The SPARCstation 2 and IPX do not use conventional fuses. Instead, they use three self-healing thermal devices for SCSI, keyboard, and Ethernet power which normally never need to be replaced. This type of circuit breaker is turned off when it gets too hot. It requires removal of the short condition and some cool off period.

Warning – Before performing this procedure, make sure the system power is turned off. Failure to comply may result in physical injury.

Do the following in sequence:

1. **If the short condition is outside the system unit, remove it.**
2. **Wait about ten minutes and reboot the system.**

If the aforementioned procedure does not solve the problem, there might be a short condition which exists inside the system unit. Do the following in sequence:

1. **Remove the system unit cover. Refer to Chapter 4 on how to remove the system unit cover. Follow all the safety cautions and warnings.**
2. **Visually inspect and remove any foreign matter or metal pieces that might have been introduced in the GX installation process.**
3. **Close the system unit as described in Chapter 4.**
4. **Wait for about 10 minutes and reboot the system.**

If the problem still exists, contact Sun Microsystems at **1-800-USA-4SUN** or contact your Sun Sales Representative. If you are outside the USA, contact your nearest Sun Answer Center. Refer to "Getting Help" in Appendix A. See also Table A-2 that contains phone numbers for these Answer Centers.

SPARCstation 1, 1+, and IPC Fuses

Warning – Before performing this procedure, make sure the system power is turned off. Failure to comply may result in physical injury.

The SPARCstations 1, 1+, and IPC use three 2 amp, 125V plug-in fuses in sockets for SCSI, keyboard, and Ethernet power. These fuses are located on the CPU board and you need to remove the system cover to check them. Figure D-1 shows an exploded view of the fuse. To check and replace the fuse, do the following:

1. **Refer to Chapters 3 and 4 for a complete description of safety instructions, shut down, and cover removal procedure for the appropriate system.**
2. **Locate the fuses as shown in Figure D-2 and Figure D-3.**

3. **Remove the fuses and perform very close visual inspection. If a fuse seems to be blown, remove it by pulling it outward using your fingers as shown in Figure D-2 and Figure D-3. Replace with a new fuse (2 amp 125 V). If you do not have one, contact your normal support channel to obtain one.**

4. **Reinstall the fuse by reversing the removal procedure. Make sure the fuse connectors are aligned with the socket holes before applying any pressure.**

Caution – Avoid using excessive force while removing or installing the fuse. In addition, do not twist the fuse to avoid damage to the fuse pins.

If the problem still exists, contact Sun Microsystems at **1-800-USA-4SUN** or contact your Sun Sales Representative.

Figure D-1 Fuse (Exploded View)

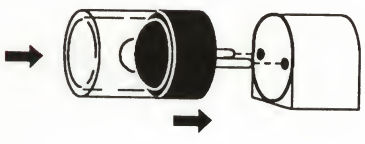


Figure D-2 SPARCstation 1 and 1+ Fuses

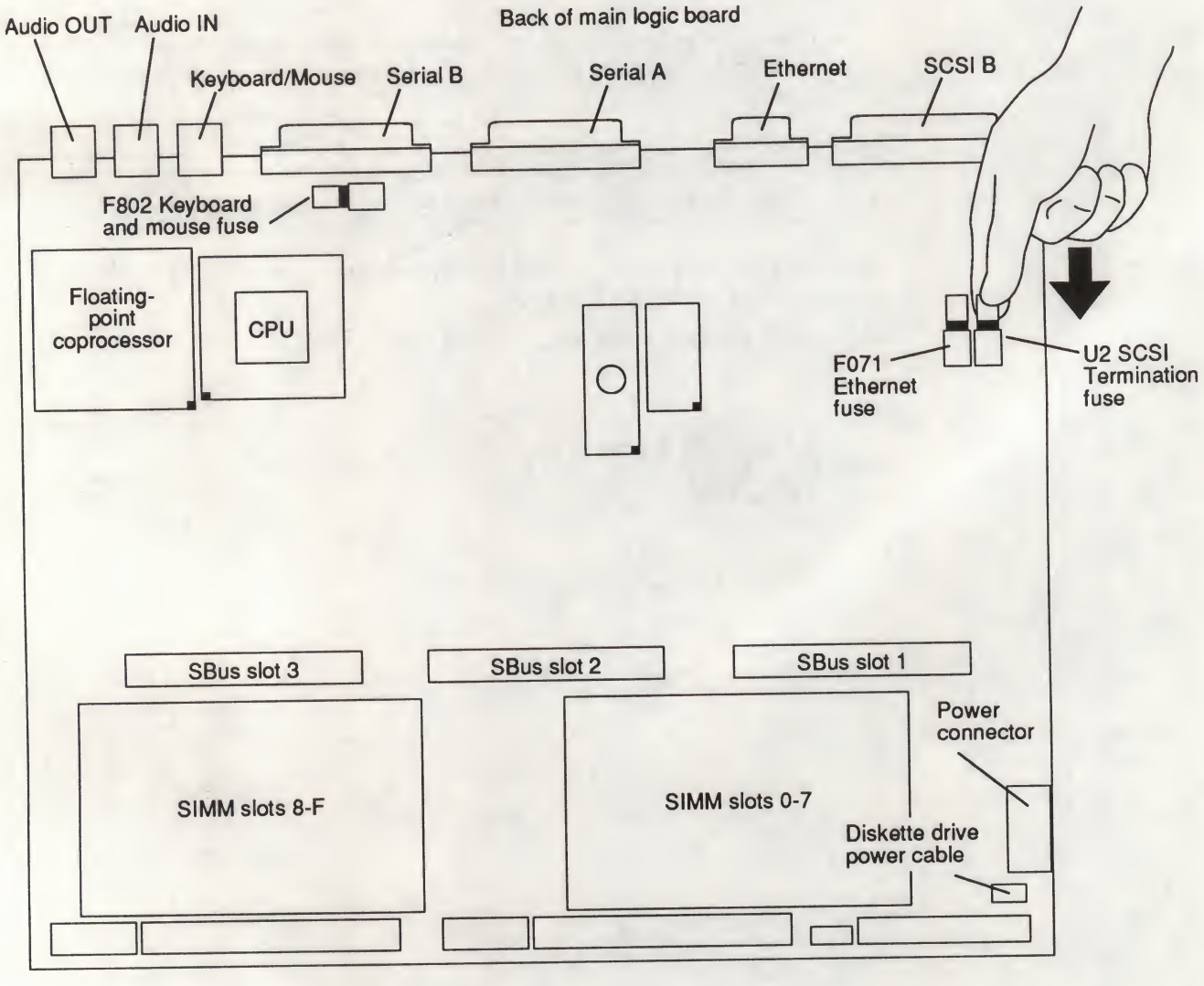
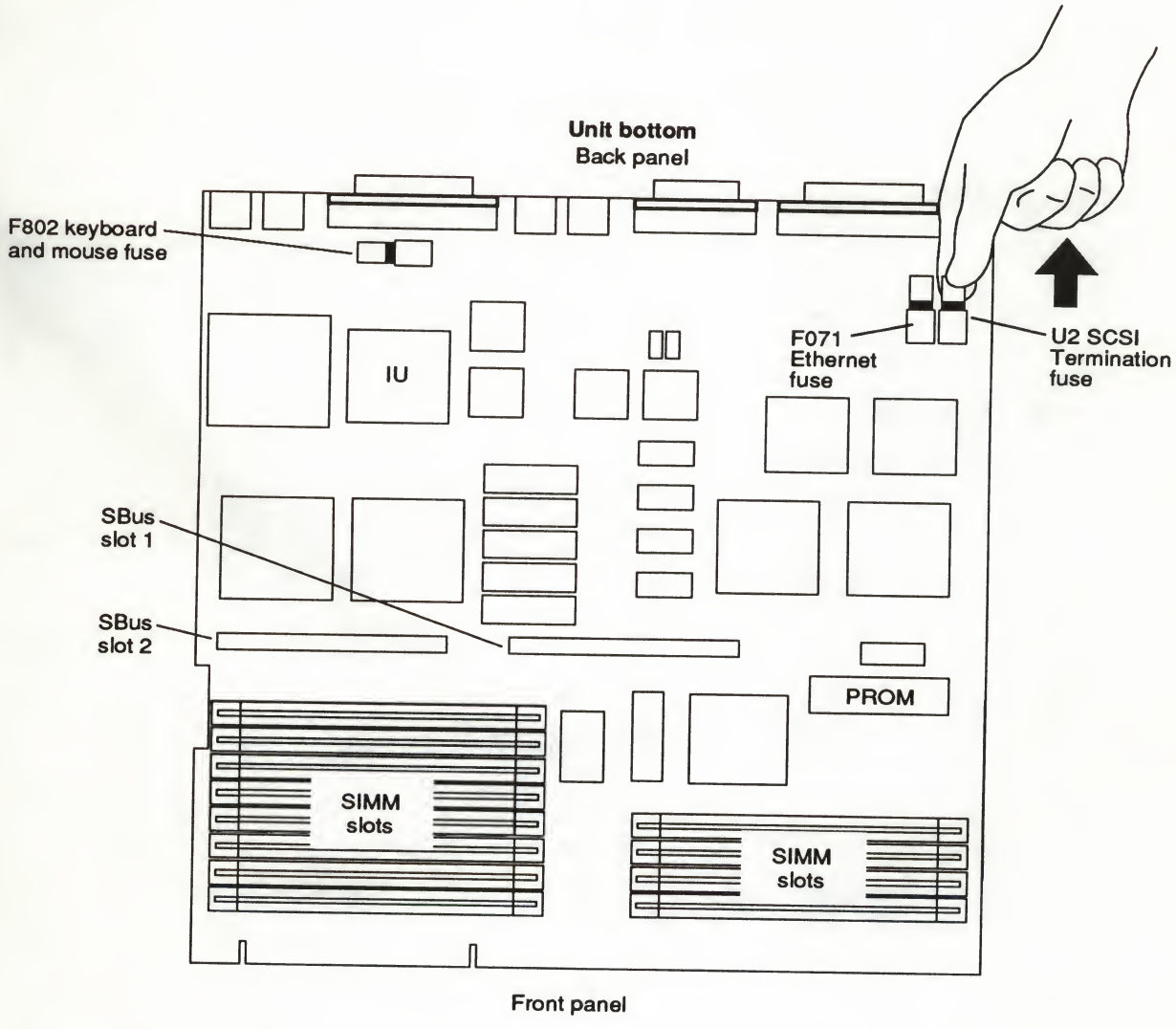


Figure D-3 SPARCstation IPC Fuses



D.7 Running Sundiag

The Sundiag tool is available to every user under SunOS. The program may be found under the `/usr/diag/sundiag` directory if diagnostics were loaded during software installation.

The following paragraphs describe how to run Sundiag in SunView. We assume that you are familiar with the SunView window system.

Setting Up

You will need to login as a superuser (root) in order to run Sundiag. Sundiag also needs to write the log and error files to the `/var/adm/sundiaglog` directory which should be owned by root.

Initiating Sundiag

It is best to start Sundiag from a SunView window so that you are not left with a blank SunView screen when you exit the diagnostic. If you are not running SunView when you start Sundiag, but you are logged in on the workstation under test, the SunView window is displayed on the screen. Do the following in a Sunview window:

1. **Become superuser.**
2. **Change to sundiag directory.**
3. **Execute sundiag command.**

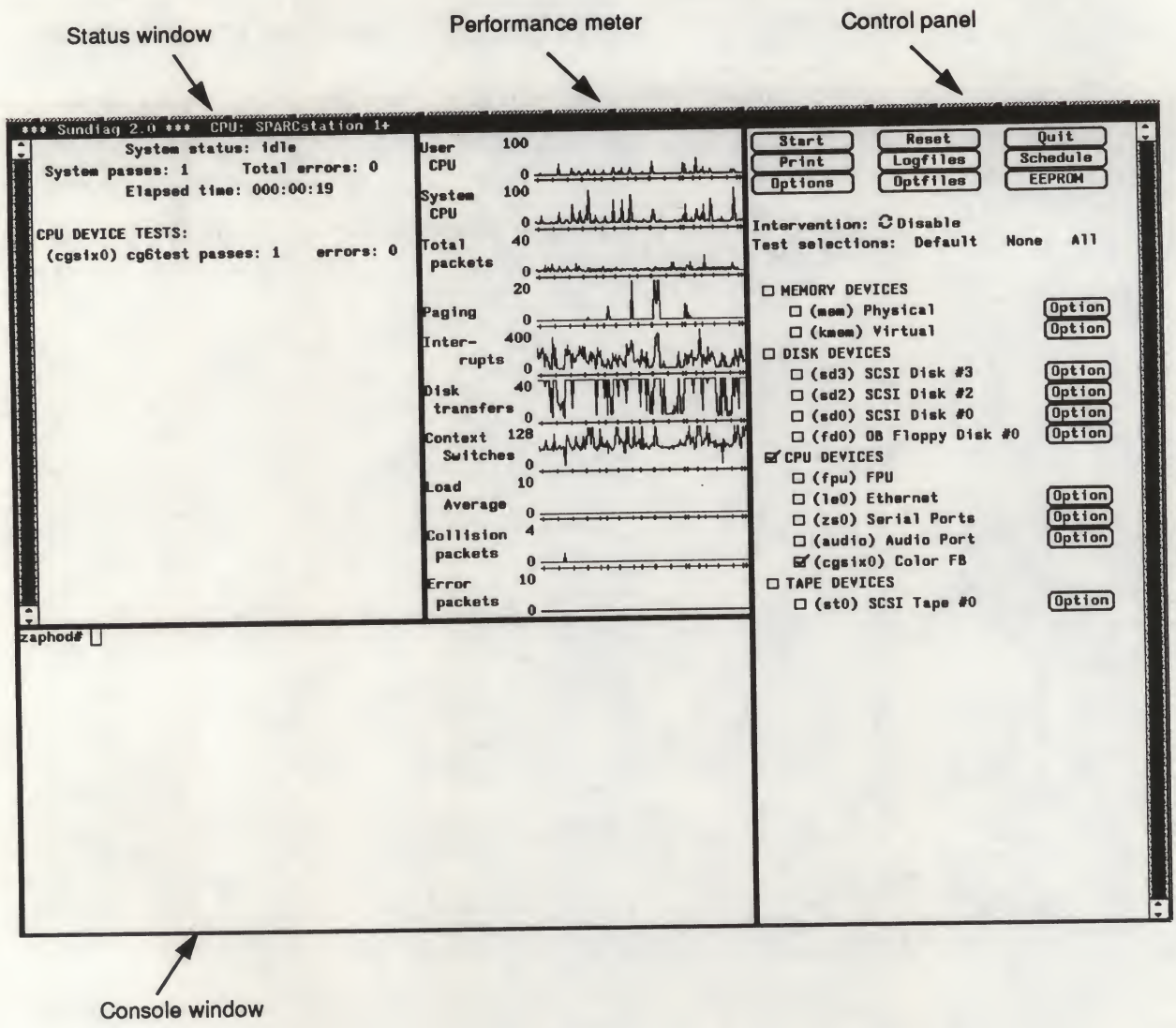
```
%su
Password:
#cd /usr/diag/sundiag
#sundiag
```

If you want to continue testing and have your screen free for other uses, simply drag the mouse to Close from the window header menu and release the mouse button. A Sundiag icon will appear on your screen, which can monitor test failures. If the icon has an X across it, it indicates an error has been found.

Note – While Sundiag is running, we recommend that you do not run any other programs or software that use the same hardware devices that Sundiag is testing.

Figure D-4 shows the Sundiag main window that appears after you execute the sundiag command.

Figure D-4 Sundiag Window



D.8 Sundiag Window Description

The Sundiag window has four sections: status window, performance meter, control panel, and console window. These sections are described below in detail.

Status Window

This window displays the system status and indicates whether or not the test has passed. In addition, it displays the name of the test, the duration of the test, and the number of times the test has been repeated.

Performance Meter

This portion of the Sundiag window displays the performance of the system during diagnostics.

Control Panel

This is the user interface window. It contains all the buttons and controls that are used to run diagnostics. The contents of the lower part of the control panel are dependent on system configuration. Figure D-4 shown above is an example of the control panel part of the Sundiag window for a SPARCstation 1+ that contains a GX (cgsix0) card in addition to several other devices. The check mark means that the device is enabled for testing. Since the scope of this chapter is to test the GX card (cgsix0), only that option has been enabled for testing.

Control Panel buttons such as Options, Optfiles, and Schedule become inoperative and appear shaded on the control panel after testing has started, meaning that the options they represent are valid only when tests are stopped.

Console Window

This window displays all the system-related messages that are normally displayed for a particular task in a console window including any error messages.

Starting the Test

Press the Start button on the Control Panel to start the test. When you push the Start button, the test begins and the status of this button changes to Stop. (This button toggles between Start and Stop.) As soon as the test begins, you will see several test patterns on the screen for about 20 seconds. System status changes from idle to testing. There is a pause of few seconds after the test is completed. If you do not stop the test, it will keep repeating.

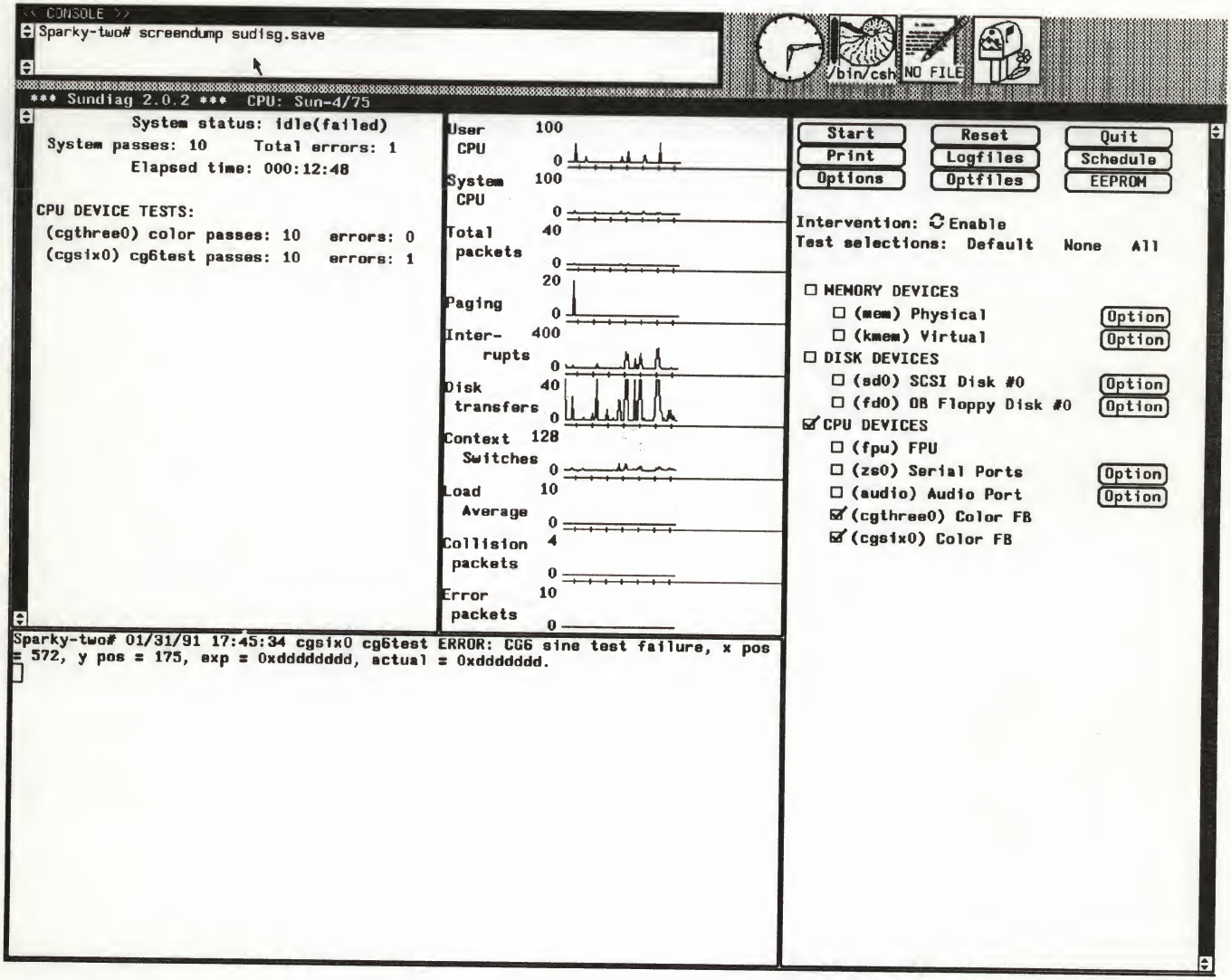
Stopping the Test

Press the Stop button to stop Sundiag. When you press the Stop button, all tests are stopped, the button changes to Start, and the system status changes to stopping and then idle. You may print the test results on your system printer and save the results of the test in a log file.

Errors

If an error occurs during the test, an error message will appear in the console window part of the Sundiag screen. Also, the status window error counter will be incremented and testing will stop. If this happens, it may mean that the GX (cgsix0) has failed one of the Sundiag test phases. Reset Sundiag by pressing the Reset button in the control panel and start the test again. If the error occurs once more, call your service representative. Figure D-5 shows the Sundiag window with an error message.

Figure D-5 Error Messages in Sundiag Window



Quitting Sundiag

To exit Sundiag from a SunView window, first click on the **Stop** button to stop any tests that are running, then click on the **Quit** button. After asking for verification, the Sundiag window will disappear.

Refer to *Sundiag User's Guide* for details.

Specifications

This appendix describes the GX specifications.

E.1 GX Specifications Summary

Physical Specifications

Length: 146.70 mm

Width: 83.82 mm

Weight: 5.7 Oz.

Electrical Specifications

Input Requirements

Current: 1 amp (approximate)

Power Requirements: +5 volts ±5%

Heat dissipation: 5 watts

Load Condition: Running special code designed for exercising the frame buffer to the maximum power.

Environmental Specifications

Temperature range: Between 32 and 104 degrees Fahrenheit (0 and 40 degrees Celsius)

Humidity: Between 5% and 80% (relative noncondensing)

Altitude: Between 0 and 10,000 feet (0 and 3048 meters)

Resolutions

1152 x 900 @66 Hz

1152 x 900 @76 Hz

Interface Requirements

Connector type: SBus

Agency Certification

FCC Class B

DOC Class B

VCCI Class 2

UL

CSA

TUV

Compatibility

SBus compatible.

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